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Study on the assessment of nutritional and health status of children from Orpahanages

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Abstract: Background: Many of children living in orphanages suffer from physical neglect, poor hygiene and a lack of nurturing which results in various health problems among these children. **Aim:** This research was conducted to study the nutritional and health status of children from orphanages **Methodology:** A cross sectional study was conducted in Mumbai among 100 children living in orphanages aged between 12-15 years. Anthropometric measurements were measured. Physical activity pattern, psychological health and eating habits were assessed by a structured questionnaire which included questions on eating habits, food frequency and three day diet recall. Analyses were performed by SPSS software (SPSS, version 16). Data was presented using Independent Sample Z-test, chi-square test, Pearson's correlation. Findings were considered to be significant when $p \leq 0.05$ and were considered highly significant when $p \leq 0.01$.**Results:** Of the total number of 100 participants 50% were boys and 50% were girls. The height and the weight results indicated highly significant lower differences when compared with reference standards. Most of the participants had BMI less than the 5th percentile and it was observed that 46% boys and 56% girls were underweight. It was observed that most of the participants played indoor and outdoor games every day. Most of them were not involved in any kind of leisure activities. All the participants helped in the daily chores and activities. It was observed that most of the participants had almost 8 hours of sleep daily and they did not have any trouble sleeping during the night. Whereas most of the participants had trouble concentrating in studies or daily activities on several days. . It was observed that cereals, dals were consumed by the participants mostly on daily basis. The foods such as vegetables, fruits, dairy products, processed foods, junk food, bakery items were consumed moderately by the participants. **Conclusion:** It was observed from the study that participants anthropometric measurements like the height and weight were below the reference standards and most of the participants had a low BMI and were underweight. Macro and micro nutrient deficiency seen among the participants. Efforts need to be taken to improve the nutritional intake of the children living in the orphanages.

Keywords: malnutrition, nutritional deficiencies, orphanage children, physical activity, psychological health.

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Introduction-

An orphan is a child permanently bereaved of or abandoned by his or her parents. Many of these children suffer from physical neglect, poor hygiene and a lack of nurturing is all too common even in today's modern orphanages which results in various health problems among children (George R, 2015). An orphanage is a residential institution devoted to the care of orphans – children whose natural parents are deceased or otherwise unable or unwilling to care for them (Funkquist A., 2007). The number of orphans is increasing daily. The basic human rights of these children are violated and severely threatened. Orphans are usually emotionally deprived, financially challenged and desperate (Towanda N, 2016). According to 2010 UNICEF Report, it is estimated there are between 143 million to 210 million orphans in world wide. Everyday 5,760 more children become orphans. Every 2.2 seconds a child loses a parent somewhere in the world. In India, 31 million children living as orphans. Indian Health Ministry and UNICEF estimated that 46% of children under age 3 are suffering from malnutrition (Unicef, 2010).

Most common problems faced by orphans include loss of home, high dropout rate from school, lack of health care and problems with immunization, social downfall, child labors and drug abuse (Wright 2009). Physical activity contributes to health benefits and quality of life of children and adolescents, high prevalence of physical inactivity, especially among orphan girls, has been reported in children from low education and low income communities (Oeshlschlaeger MHK, 2014). Children living in orphanage experience difficulty in their life because their emotional needs are not met by their parents. Hence, they might have some psychological problems. Especially, orphans need help to solve their life's problem (Tümkaya & Songül, 2015). Orphans are among such disadvantaged children living in the community with poverty, severe grief and easily subjected to abuse, negligence and exploitation (Savkova, 2013). There have been differences in nutrition related problems such as Protein Energy Malnutrition (PEM), Vitamin A and B Complex deficiencies, iron deficiency anemia and iodine deficiency disorders between children who are living with their families and children who are living in institution run by government and non-government organizations (Sanou D. et al, 2008). Urban malnutrition is an increasing problem globally being more severe among children living in orphanages. Children in orphanages suffer from malnutrition and infectious diseases. Nutritional reduction leads to immune compromise, resulting in recurrent and increasingly rigorous infections which further compromise nutritional intake and ultimately may threaten the child's survival (Madumita et al., 2017).

Methodology-

A cross sectional study was conducted among 100 children living in orphanages, of age 12-15 years who were selected from Mumbai city. Purposive sampling technique was used. A questionnaire was administered which included general information, anthropometric measurement (Height, Weight & Body mass index). Question's related to physical activity pattern, psychological health and three day dietary recall was taken though an interview. The data was analysed by using statistical package of social sciences (SPSS, version 16). Frequencies,

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percentages, measures of centre and measures of variability were computed. Advanced statistics was done by Chi square test which was used to analyse the representation of cases across the values of a single variable and one sample Z test was used for comparing with reference standards. Findings were considered to be significant when $p \leq 0.05$ and were considered highly significant when $p \leq 0.01$.

Results-

A) General Information

In the present study the participants ranged from 12-15 years with the mean age of 13.42 years. The study group consisted of Boys (50%) and Girls (50%).

B) Anthropometric Measurements

Table 1- Height and Weight of the Study Group

Height	**Reference Standards (ICMR, 2010) (cm)**	**Mean (cm)**	**Standard Deviation (SD)**	**Z value**	**p value**
Boys	153.97	148.43	8.493	-4.611	**0.000****
Girls	151.57	150.22	6.133	-1.559	**0.125**
Weight	**Reference Standards (ICMR, 2010) (kg)**	**Mean (kg)**	**Standard Deviation (SD)**	**Z value**	**p value**
Boys	47.6	38.91	10.025	-6.129	**0.000****
Girls	46.6	38.11	7.845	-7.652	**0.000****

Table 1 describes the height and weight of the study group. The mean height (boys) was around 148.43cm and the standard deviation was 8.493 ($Z= -4.611$, $p<0.01$) for height when compared with reference standard. The mean height (girls) was around 150.22cm and the standard deviation was 6.133 ($Z= -1.559$, $p=0.125$) for height when compared with reference standard. The mean weight (boys) was around 38.91kg and the standard deviation was 10.025 ($Z= -6.129$, $p<0.01$) for weight when compared with reference standard. The mean weight (girls) was around 38.11kg and the standard deviation was 7.845 ($Z= -7.652$, $p<0.01$) for weight when compared with reference standard.

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Fig 1- BMI of the study group (boys)

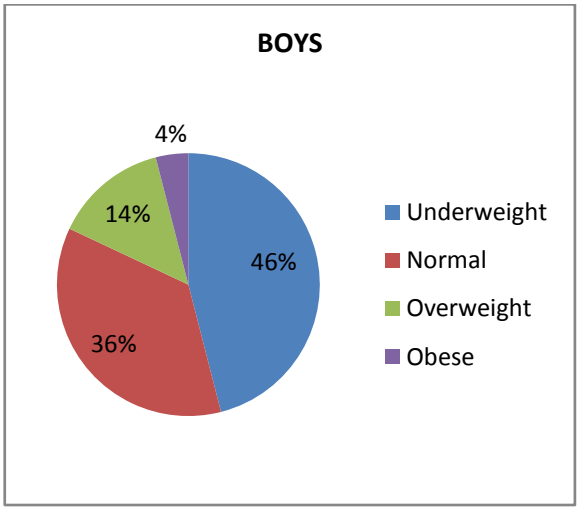
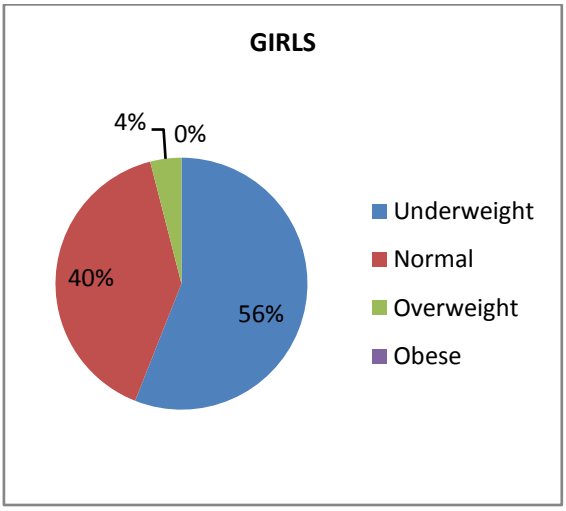


Fig 2- BMI of study group (girls)



From fig 1 and 2 the BMI of the participants- boys (46%) and girls (56%) was in the underweight category. Hence was indicated that most of the participants were underweight and had a risk of developing co-morbidities and malnutrition in the near future.

A cross-sectional study was conducted among the children in Sir Salimullah Muslim Orphanage, Dhaka in 2014. Anthropometric measurements of the children were taken and the WHO reference growth chart was used to determine the children's nutritional status. The majority of the children (60.3%) in the orphanage were malnourished, with mild, moderate and severe malnourished being 43.1%, 16.8% and 0.4%, respectively. Malnutrition was higher among the boys than girls in the age group of 15-18 years. The orphans suffered significantly ($P<0.05$) from malnutrition compared to those, who had at least one parent alive. Malnutrition was highly prevalent among children and adolescents under residential care and should be assessed. (Chowdhury ABMA, 2014)

C) Physical Activity Pattern

Table 2- Physical Activity Pattern of the Study Group

Variables	Options	Percentage (%)	Chi square	p value
Going out to play everyday	Yes	**45**	12.740	**0.000****
	No	38		
	Sometimes	17		
Type of sport played outdoor	Badminton	17	60.100	**0.000****
	Basketball	4		
	Cricket	**38**		
	Football	3		

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	None	**38**		
Playing indoor games	Yes	**90**	64.000	**0.000****
	No	10		
Type of indoor games	Board games	20	85.280	**0.000****
	Carrom	**64**		
	Table tennis	6		
	None	10		
Activities done in leisure time	Art work	28	13.040	**0.000****
	Stitching	22		
	None	**50**		
Participation in daily chores/ activities.	Yes	**100**	-	-
	No	0		
	Clean rooms	46	38.960	**0.000****
	Gardening	4		
	Wash clothes	**50**		

From table no. 2 most of the participants expressed that they went to play outside everyday {(45%) (X^2=12.740, p<0.01)}. Out of them majority played cricket {(38%) (X^2=60.100, p<0.01)} Majority of the participants played indoor games {(90%) (X^2=64.000, p<0.01)} and most of them played carrom {(64%) (X^2=85.280, p<0.01)}. In their leisure time most of the participants were not involved in any activities{(50%) (X^2=13.040, p<0.01)} and some of them were involved in stitching and art work. All the participants in the orphanages helped in the daily chores and activities (100%) About half of them washed clothes everyday {(50%) (X^2=38.960, p<0.01)} and the others helped in cleaning the rooms and some helped in gardening.

Physical inactivity and low consumption of fruits and vegetables (FV) during adolescence may persist through adulthood, putting adolescents at risk of developing chronic diseases. In a study conducted, less than 30% of adolescents across all countries met the WHO guidelines for FV consumption or physical activity (PA). Adolescent boys were more active than girls. Adolescents achieving the WHO recommendations for daily consumption of FV and PA were consistently low in all countries (Sandra A Darfour et al, 2018).

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D) Psychological Health

Table 3- Psychological Health of the Study Group

Variables	Options	Percentage (%)	Chi square	p value
Not able to sleep during the night	Not at all	**81**	102.620	**0.000****
	Several days	12		
	More than half the days	0		
	Nearly everyday	7		
Getting easily annoyed and irritable	Not at all	**62**	41.840	**0.000****
	Several days	28		
	More than half the days	10		
	Nearly everyday	0		
Trouble concentrating in studies or daily activities	Not at all	29	61.760	**0.000****
	Several days	**55**		
	More than half the days	3		
	Nearly everyday	13		
Having someone to share the problems	Yes	**62**	5.760	**0.009**
	No	38		

From table no. 3 it was observed that most of the participants had almost 8 hours of sleep daily and they did not have any trouble sleeping during the night {(81%) (X^2=102.620, p<0.01)}. {(62%) (X^2=41.840, p<0.01)} were not easily annoyed, while some experienced this on several days. Whereas most of the participants had trouble concentrating in studies or daily activities on several days {(55%) (X^2=61.760, p<0.01)}. Majority of the participants had someone to share to share their problems {(62%) (X^2=5.760, p=0.009)} i.e. the counsellor in the orphanage and friends.

An association between diet quality and patterns and mental health in children and adolescents was assessed. There was a positive relationship between unhealthy dietary patterns and poorer mental health in children and adolescents. Good-quality diet and better mental health had a positive effect on the child's future (Adrienne O' Neil et al, 2014).

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E) Food Frequency

It was observed from the food frequency questionnaire that the participants consumed cereals, dals mostly on daily basis. The foods such as vegetables, fruits, dairy products, processed foods, junk food, bakery items were consumed moderately by the participants.

Junk foods are rich in calories, salt and fats. Excess consumption of junk foods leads rise to wide variety of health disorders. Consuming junk foods might stop the children from taking healthy meals either at school or at home. The practice of high consumption of junk foods like maggi noodles, burgers, pav-bhaji, sandwiches, hot dogs, patties, pastries, pop-corn, potato chips, carbonated drinks, biscuits, muffins, toast, kulcha-channa, samosa, chocolates etc have become common feature of adolescent's diet throughout the world.. They frequently over consume fast foods and under consume fruits, vegetables and dairy products. there is a need to focus on nutrition counseling to facilitate the intake of healthy foods (Geeta Arya et al, 2013).

A study was conducted to evaluate dietary calcium intakes, anthropometric measures, and bone health in children with a history of long-term cow's milk avoidance. The reasons for milk avoidance were intolerance (40%), bad taste (42%), and lifestyle choice (18%). Dietary calcium intakes were low (443 ± 230 mg Ca/d), and few children consumed substitute calcium-rich drinks or mineral supplements. Although 9 children (18%) had a lower total-body bone mineral content ($P <$ 0.01), Twelve children (24%) had previously broken. In growing children, long-term avoidance of cow milk is associated with small stature and poor bone health (Ruth E Black et al, 2012).

F) Nutrient Intake

Table 4- Nutrient Intake by the Study Group (Boys)

NUTRIENT	RDA (ICMR, 2017)	MEAN	MEAN DIFFERENCE	Z VALUE	p VALUE
Energy (kcal)	**2750**	1122.78 ±964.21	-1043.493	-26.449	**0.000****
Protein (gms)	**54.3**	25.76 ±21.53	-23.648	-22.461	**0.000****
Fat (gms)	**45**	26.20 ±23.45	-24.823	-36.322	**0.000****
Calcium (mg)	**800**	608.84 ±572.18	-590.509	-64.726	**0.000****
Iron (mg)	**32**	20.04 ±18.49	-19.262	-49.989	**0.000****

From table no. 4- The mean Energy intake was 1123kcals and the participants were deficient by -1043.493kcals (Z= -26.449, p<0.01) when compared with the energy intake of RDA value. The

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mean Protein intake was 25.76g and the participants were deficient by -23.648g (Z= -22.461, p<0.01) when compared with the protein intake of RDA value. The mean Fat intake was around 26.20g and the participants were deficient by -24.823g (Z= -36.322, p<0.01) when compared with the fat intake of RDA value. The mean Calcium intake was 608.84mg and the participants were deficient by -590.509mg (Z= -64.726, p<0.01) when compared with the calcium intake of RDA value. The mean Iron intake was 20.04mg and the participants were deficient by –19.262mg (Z= -49.989, p<0.01) when compared with the iron intake of RDA value. Thus for both macro and micro nutrient intake was significantly below reference standards.

Table 5- Nutrient Intake of Study Group (Girls)

NUTRIENT	RDA (ICMR, 2017)	MEAN	MEAN DIFFERENCE	Z VALUE	p VALUE
Energy (kcal)	**2330**	902.03 ±811.18	-856.607	-37.897	**0.000****
Protein (gms)	**51.9**	27.13 ±24.49	-25.809	-39.385	**0.000****
Fat (gms)	**40**	21.82 ±19.96	-20.888	-45.098	**0.000****
Calcium (mg)	**800**	629.82 ±602.35	-616.085	-90.118	**0.000****
Iron (mg)	**27**	15.10 ±13.81	-14.457	-45.157	**0.000****

From table no. 5- The mean Energy intake was 902kcals and the participants were deficient by -856.607kcals (Z= -37.897, p<0.01) when compared with the energy intake of RDA value. The mean Protein intake was 27.13g and the participants were deficient by -25.809g (Z= -39.385, p<0.01) when compared with the protein intake of RDA value. The mean Fat intake was around 21.82g and the participants were deficient by -20.888g (Z= -45.098, p<0.01) when compared with the fat intake of RDA value. The mean Calcium intake was 629.82mg and the participants were deficient by -616.085mg (Z= -90.118, p<0.01) when compared with the calcium intake of RDA value. The mean Iron intake was 15.10mg and the participants were deficient by –14.457mg (Z= -45.147, p<0.01) when compared with the iron intake of RDA value. Thus for both macro and micro nutrient intake was significantly below reference standards.

Conclusion-

It can be concluded from the above study that the energy, macronutrient and micronutrient consumption was low among the orphanage children. It was observed that cereals, dals were consumed by the participants mostly on daily basis. The foods such as vegetables, fruits, dairy products, processed foods, junk food, bakery items were consumed moderately by the participants. Hence the children from the orphanage should be encouraged to eat healthy foods

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such as fruits, vegetables, milk and dairy products on daily basis which will provide children with proteins, iron, calcium and will ensure their proper growth and functioning. They should be made aware of the importance of physical activity and should be encouraged to follow healthy eating habits.

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